# Proposal for a New Ambient Air Monitoring Station for the Near- Road Environment Louisville, Kentucky

**Louisville Metro Air Pollution Control District**
**Air Monitoring Unit**
**850 Barret Avenue**
**Louisville Kentucky 40204**

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**Near-road Multi-pollutant Ambient Air Monitoring Station**

On February 9, 2010, EPA promulgated new minimum monitoring requirements for the nitrogen dioxide ($NO_2$) monitoring network in support of a newly revised 1-hour $NO_2$ National Ambient Air Quality Standards (NAAQS) and the retained annual NAAQS. In the new monitoring requirements, state and local air monitoring agencies are required to install near-road $NO_2$ monitoring stations at locations where peak hourly $NO_2$ concentrations are expected to occur within the near-road environment in larger urban areas. State and local air agencies are required to consider traffic volumes, fleet mix, roadway design, traffic congestion patterns, local terrain or topography, and meteorology in determining where a required near-road $NO_2$ monitor should be placed. In addition to those required considerations listed above, there are other factors that impact the selection and implementation of a near-road monitoring station including satisfying siting criteria, site logistics (e.g., gaining access to property and safety), and population exposure. The establishment of near-road $NO_2$ monitoring stations will create an infrastructure that will likely be capable of housing other ambient air monitoring equipment. Considering placement of the near-road $NO_2$ monitoring stations for multi-pollutant monitoring, even though it may not be required, matches with the Environmental Protection Agency's multi-pollutant paradigm, presented in the *Ambient Air Monitoring Strategy for State, Local, and Tribal Air Agencies* *http://www.epa.gov/ttnamti1/files/ambient/monitorstrat/AAMS%20for%20SLTs%20%20-%20FINAL%20Dec%202008.pdf*d published in 2008, and has been noted within documents associated with the $NO_2$ NAAQS revision of 2010 and the carbon monoxide (CO) NAAQS review of 2011. The intent of the multi-pollutant paradigm is to encourage the integration of multiple individual pollutant monitoring networks to broaden the understanding of air quality conditions and pollutant interactions, furthering the ability to evaluate air quality models, develop emissions control strategies, and support long-term scientific studies (including health studies).

**Site Selection Process:**

The Louisville Metro Air Pollution Control District (LMAPCD) created comparison matrices for many potential locations for a near-road monitoring station based on the Near-Road $NO_2$ Monitoring Technical Assistance Document from the United States Environmental Protection Agency (EPA). Many locations were discarded due to unsafe conditions, obstructions, or inadequate infrastructure. Two ideal locations were selected and toured by EPA Region 4 and EPA Science and Ecosystems Support Division representatives. LMAPCD was denied permission to place the site at one these locations and thus has determined that a property currently owned by the Kentucky Department of Transportation (KYTC) is the most ideal placement of the near-road site. The property is part of the electrical maintenance facility operated by KYTC at 1517 Durrett Lane, Louisville, Kentucky 40213. This area is located directly along the north side of Interstate 264 at latitude 38.1935 and longitude -85.7121. (Images 1 & 2). The proposed location is a small frontage area between the electrical maintenance facility and Durrett Lane. Durrett Lane as well as the proposed site location is part of the federal right of way

of the interstate. Due to this, LMAPCD must obtain a permit before site implementation can occur. Also attached is the proposed work plan for site implementation. LMAPCD requests EPA approval to implement the near-road multi-pollutant ambient air monitoring station for Louisville, KY at this location.

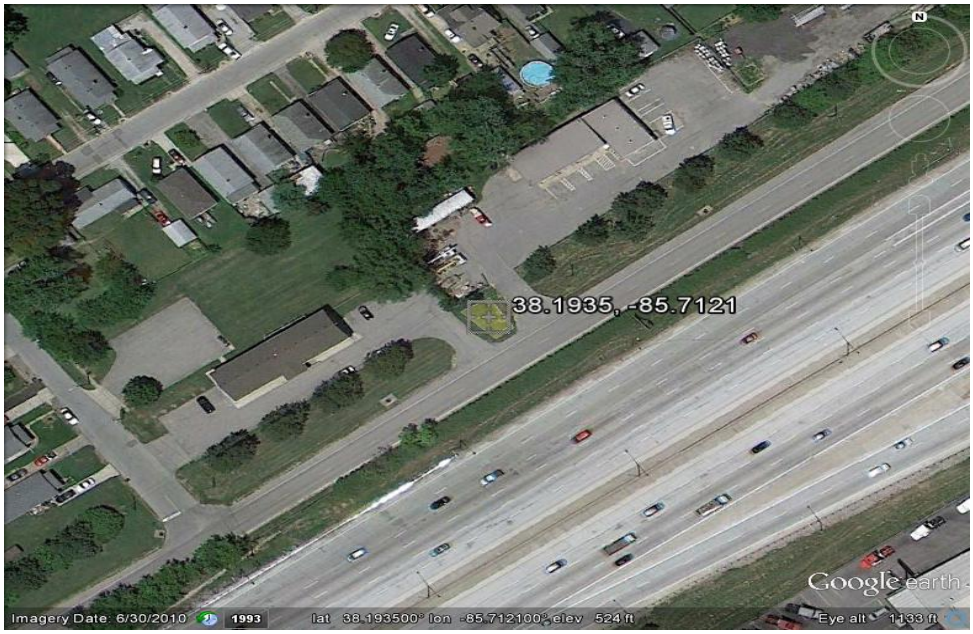



**Image 1**: Aerial photo of proposed site location – 1517 Durrett Lane, 0.90 miles north of the I-264/I-65 interchange.


**Image 2:** Zoomed aerial photo of proposed site location.

**Near-Road Air Monitoring Station Site**

- **Siting** - The site for this air monitoring station allows for conformity with siting requirements for ambient air monitors listed in 40 CFR Part 58 Appendix E including the following criteria listed as key to the Near-Road application:

| **Near-Road $NO_2$ Siting Criteria (per 40 CFR Part 58, Appendix E)** | |
|---|---|
| Horizontal spacing | According to 40 CFR Part 58 Appendix E: "As near as practicable to the outside nearest edge of the traffic lanes of the target road segment; but shall not be located at a distance greater than 50 meters, in the horizontal, from the outside nearest edge of the traffic lanes of the target road segment."<br>**This TAD recommends that the target distance for near-road $NO_2$ monitor probes be within 20 meters of the target road whenever possible.** |
| Vertical spacing | Microscale near-road $NO_2$ monitoring sites are required to have sampler inlets between 2 and 7 meters above ground level. |
| Spacing from supporting structures | The probe must be at least 1 meter vertically or horizontally away from any supporting structure, walls, parapets, penthouses, etc., and away from dusty or dirty areas. |
| Spacing from obstructions | For near-road $NO_2$ monitoring stations, the monitor probe shall have an unobstructed air flow between the monitor probe and the outside nearest edge of the traffic lanes of the target road segment, where no obstacles exist at or above the height of the monitor probe. |

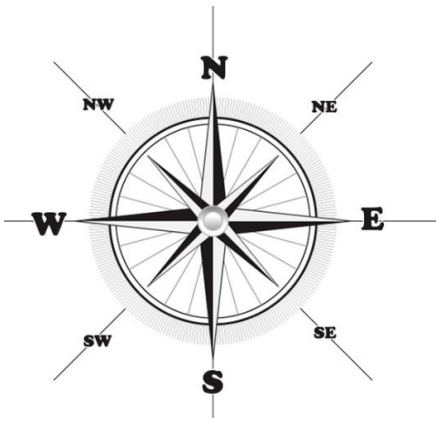
LMAPCD estimates that horizontal distance from the probes to the nearest edge of the target road segment to be 25 to 28 meters.

- **Proposed AQS Site ID**: 21-111-0075.

- **Street Address and Coordinates**: 1517 Durrett Lane, Louisville, KY. Latitude 38.1935 and Longitude -85.7121.

- **Target Road Segment**: Interstate 265 - from Interstate 65 to Poplar Level Rd.

- **Site Photos:**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- **Distance from probe to edge of target road**: Approximately 27 meters.

- **Property Description**: Property owned by the Kentucky Department of Transportation. Proposed site location is a small flat grass lot in front of the KYTC electrical maintenance facility. Area would provide easy access and operator safety. Site implementation is contingent on approval by the United States Department of Transportation.

**Image 3**: Frontal view of the potential site plot.

- **Roadway Design**: Interstate 265 runs east/west. The proposed site location is on the north side of the interstate.

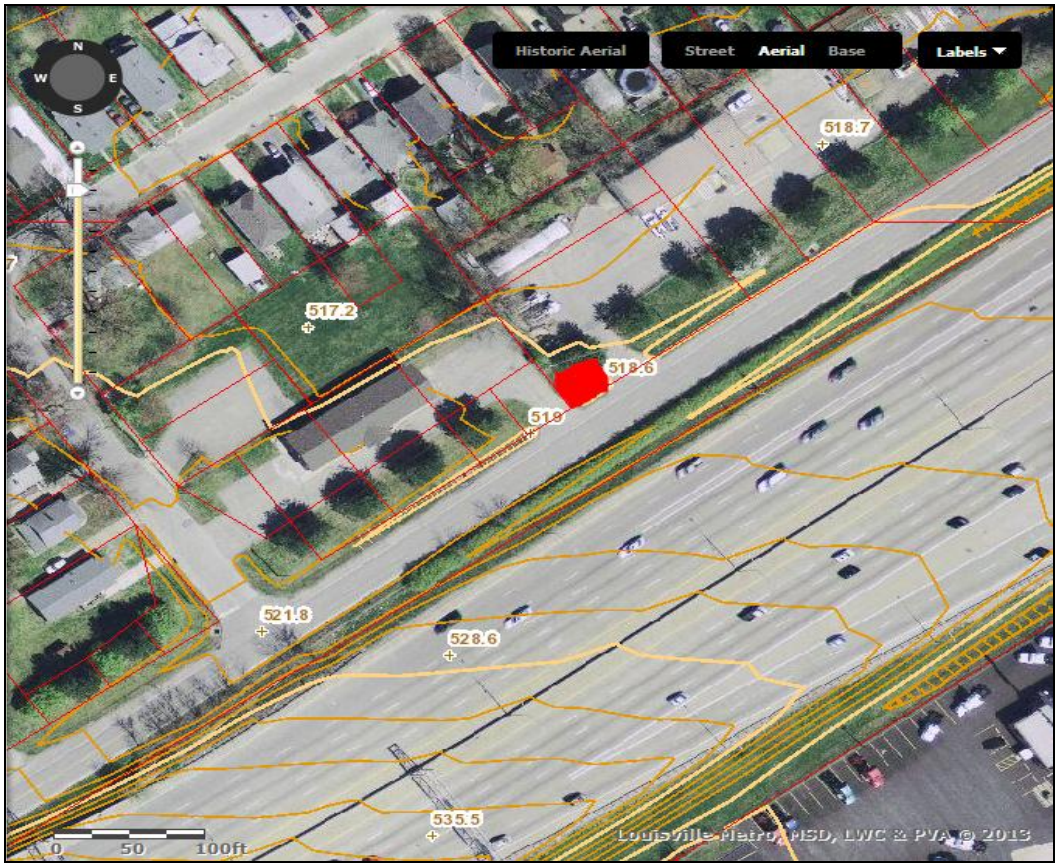


**Image 4**: Terrain and elevation of the roadway. The area shaded red is the proposed location.

- **Presence of roadside structures:** There are three small trees on the area where the site is proposed. These trees would be removed. Also, between the site location and the Interstate is a wire fence approximately 10 feet tall. Along this fence a hedge is growing to shield headlights from Durrett Lane. KYTC has given initial permission to trim and maintain this hedgerow at the height of the fence. Probe placement would be above the level of this hedgerow.

- **Windrose:**

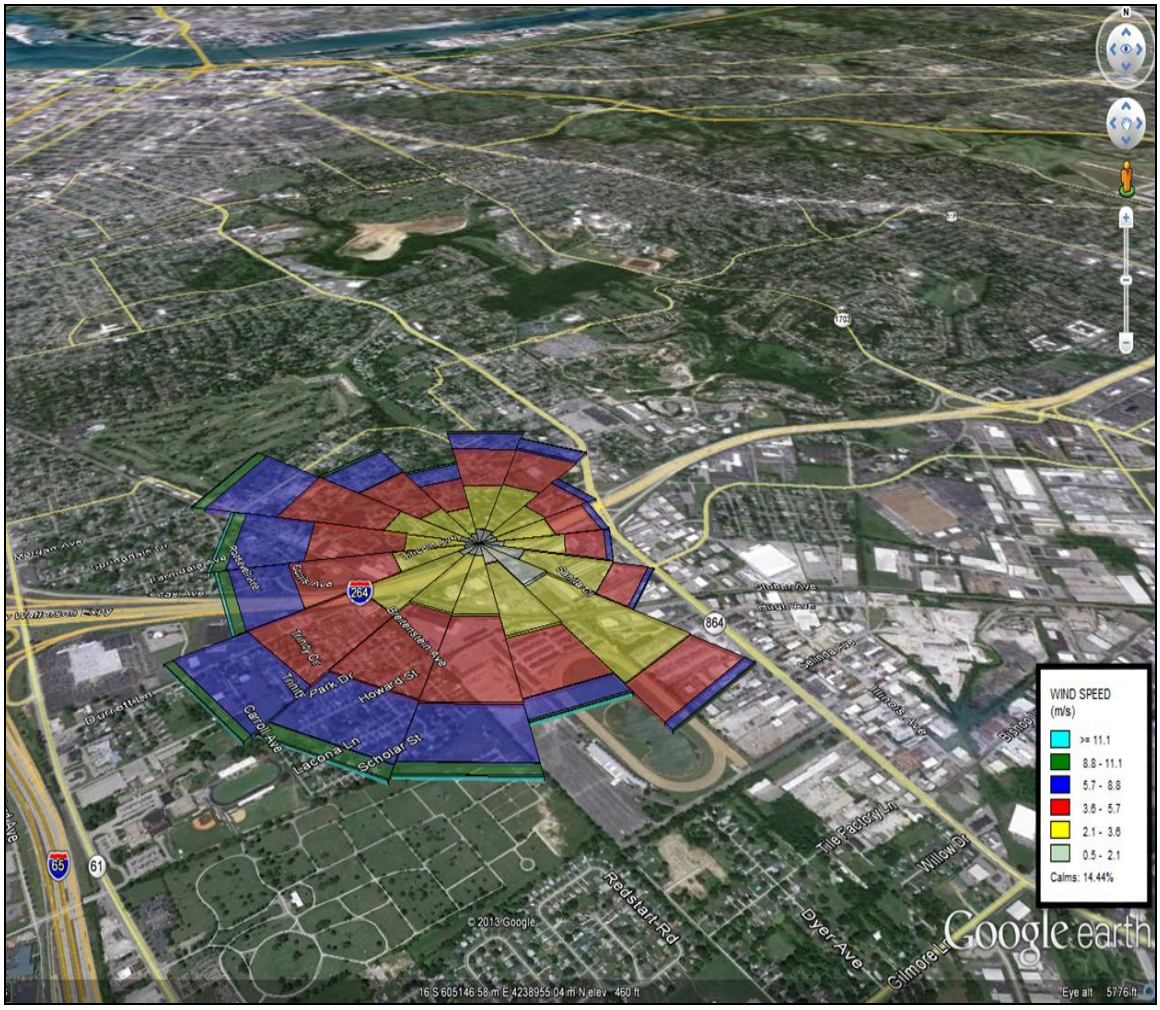


**Image 5**: Windrose is centered directly on proposed site location (38.1935, -85.7121). Surface wind data from Louisville International Airport 2007-2011.

- **Traffic Data/Ranking**:

| TRAFFIC VOLUME / CHARACTERISTICS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway | From | To | AADT | AADT Rank | HDV AADT | HDV AADT Rank | FE-AADT | FE-AADT Rank | LOS |
| I-65 | Grade Lane area | I-264 | 171000 | 1 | 25,000 | 1 | 396,000 | 1 | F |
| I-65 | KY 1631 (Fern Valley) | Grade Lane area | 157000 | 4 | 22,126 | 3 | 356,134 | 2 | D |
| I-65 | KY 1065 (Outer Loop) | KY 1631 (Fern Valley) | 149000 | 8 | 22,600 | 2 | 352,400 | 3 | E |
| I-65 | I-265 | KY 1065 (Outer Loop) | 129000 | 15 | 18,900 | 4 | 299,100 | 4 | C |
| I-65 | Eastern Parkway | Broadway overpass | 130055 | 13 | 18,000 | 6 | 292,055 | 5 | F |
| I-65 | I- 64 | Indiana State Line | 121000 | 16 | 18,750 | 5 | 289,750 | 6 | D |
| I-65 | I-264 | Eastern Parkway | 130000 | 14 | 15,808 | 7 | 272,272 | 7 | D |
| I-264 | I- 65 / KY 61 (Preston Hwy) | KY 864 (Poplar Level Rd) | 163,000 | 2 | 9,400 | 19 | 247,600 | 8 | D |
| I-64 | I-65 | I-71 | 144,000 | 11 | 11,300 | 14 | 245,700 | 9 | F |
| I-264 | KY 864 (Poplar Level Rd) | KY 1703 (Newburg Rd) | 158,000 | 3 | 9,200 | 20 | 240,800 | 10 | E |
| I-65 | Indiana State Line | 10th Street | 99700 | 20 | 15,450 | 8 | 238,750 | 11 | D |
| I-264 | KY 1703 (Newburg Rd) | US 31E / US 150 (Bardstown Rd) | 155,069 | 5 | 9,190 | 21 | 237,779 | 12 | D |
| I-264 | KY 1932 (Breckenridge Ln) | I- 64 | 148,000 | 9 | 9,600 | 18 | 234,400 | 13 | D |
| I-264 | US 31E / US 150 (Bardstown Rd | KY 155 (Taylorsville Rd) | 152,000 | 6 | 9,100 | 22 | 233,900 | 14 | D |
| I-64 | I-264 | Hurstbourne Pkwy. | 152,000 | 7 | 8,870 | 24 | 231,830 | 15 | E |
| I-264 | KY 1631 (Crittenden Dr) | I- 65 / KY 61 (Preston Hwy) | 133,000 | 12 | 10,906 | 16 | 231,154 | 16 | F |
| I-65 | Bullitt Co. / Jefferson Co. Line | I-265 | 98100 | 22 | 14,450 | 9 | 228,150 | 17 | C |

**Image 6**: Traffic Data obtained from the Kentuckiana Regional Planning & Development Agency in 2012.

- **Sampling and Analysis Methods**:

  Nitrogen Dioxide - Teledyne - Advanced Pollution Instrumentation, Inc. Model 200EUP (Automated Equivalent Method: EQNA-0512-200) or equivalent.

  Carbon Monoxide - Teledyne Advanced Pollution Instrumentation, Inc. Model T300U (Automated Reference Method: RFCA-1093-093) or equivalent.

  Black Carbon – Teledyne Model 633 Aethalometer or equivalent.

  Meteorological Measurements – Wind direction and speed, temperature, humidity.

- **Operating Schedules -** All instrumentation initially installed at the Near Road Site will run continuously and produce hourly averages.

- **Monitoring Objective and Spatial Scale -** The monitoring objective for near-road monitoring is maximum concentration and representative of the neighborhood scale.

- **Area Represented –** The area represented by this near-road monitoring site would be the Louisville/Jefferson County, KY-IN Metropolitan Statistical Area.